

P13-1 ANS. a. Table of Entities and Activities for Internet Payment Platform (Accounts Payable and Cash Disbursements Processes)

Entities	Para	Activities
Supplier	2	1. Log on to IPP.
	2	2. Flip PO to invoice.
IPP server	2	3. Post invoice to appreciating database.
	2	4. Send invoices to the enterprise adapter.
Enterprise adapter	2	5. Translate invoices into XML.
	2	6. Send translated invoices to BEPMIS (assumed).
BEPMIS	2	7. Post invoices to accounts payable database.
	3	8. Perform three-way match of invoice, PO, receipt.
	3	9. Extract and format invoice changes.
	3	10. Send invoice changes to enterprise adapter.
Enterprise adapter	3	11. Convert changes from IDMS to XML.
	3	12. Transmit invoice changes to IPP server.
IPP Server	3	13. Post invoice changes to appreciating database.
Accounts payable accountant	4	14. Trigger payment process.
BEPMIS	4	15. Read and display invoices due for payment (assumed).
Accounts payable accountant	4	16. Review invoices.
	4	17. Select invoices for payment.
BEPMIS	4	18. Extract and format payments.
	4	19. Generate and digitally sign PIF file.
	4	20. Transmit PIF to enterprise adapter.
	4	21. Notify AP accountant of number and dollar amount of payments.
Enterprise adapter	4	22. E-mail CO, DO, and Boston Fed with PIF totals.
	4	23. Convert PIF from IDMS to XML.
	4	24. Transmit PIF to IPP server.
IPP Server	4	25. Post PIF to appreciating database.
Contracting officer (CO)	4	26. Log on to IPP.
	4	27. Approve PIF.

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Entities	Para	Activities
Disbursing officer (DO)	4	28. Log on to IPP.
	4	29. Approve PIF.
IPP server	5	30. Generate ACH-formatted file from PIF.
	5	31. Send ACH-formatted file to Boston Fed.
	5	32. E-mail AP accountant, CO, DO, and Boston Fed with ACH totals (number and dollar amount of payments).
	5	33. E-mail supplier that a payment is coming.
Boston Fed	5	34. Transfer ACH file to FedACH system.
FedACH system	5	35. Settle payment (debit Treasury's account and credit supplier's bank's account).
	5	36. Notify supplier's bank of credits.
	5	37. Send Bulk Data Acknowledgement (number and dollar amount of payments) to AP accountant, CO, DO, Boston Fed.
Supplier's bank	5	38. Credit supplier's account.

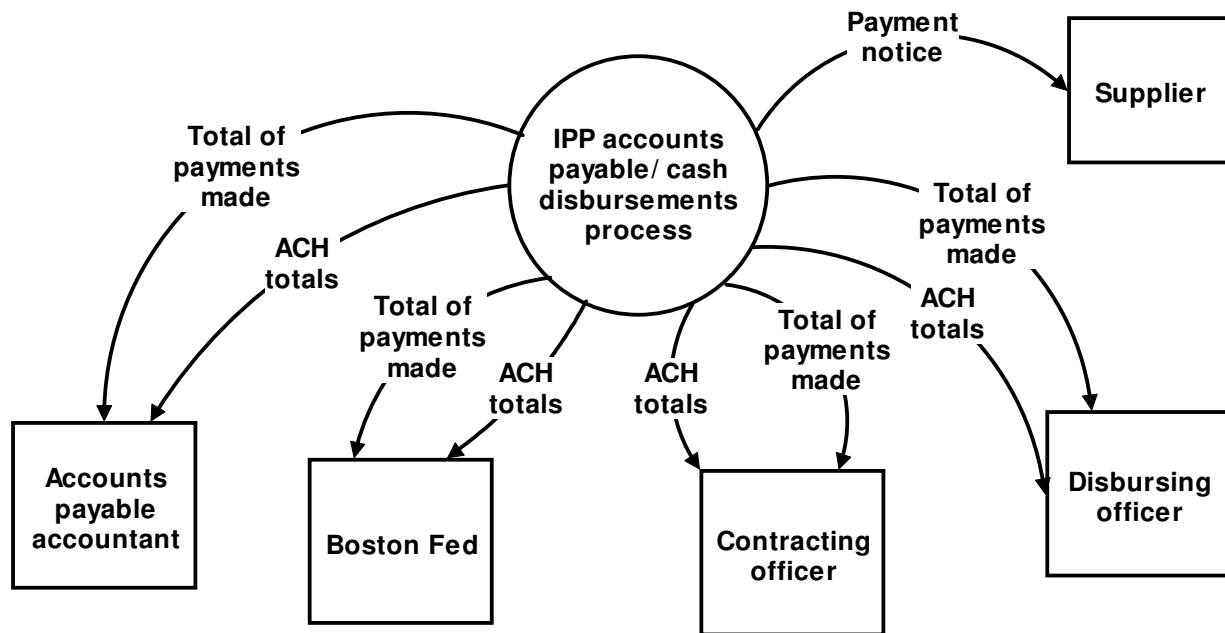


FIGURE SM-13.7 Problem 1, part b solution—context diagram for Internet Payment Platform (Accounts Payable and Cash Disbursements Processes)

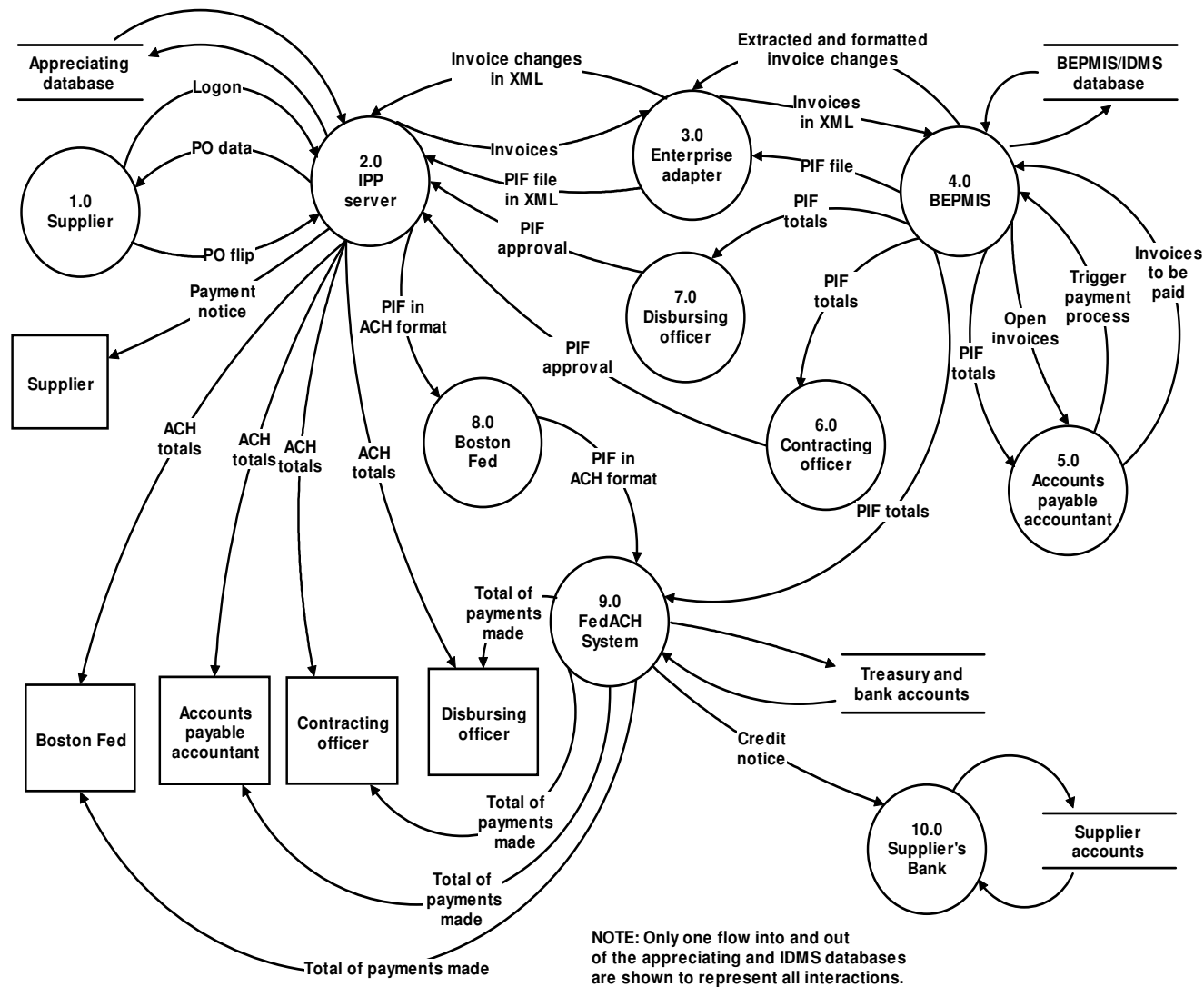


FIGURE SM-13.8 Problem 1, part c solution—physical DFD for Internet Payment Platform (Accounts Payable and Cash Disbursements Processes)

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P13-1 ANS. d. Table of Entities and Activities (Annotated) for Internet Payment Platform (Accounts Payable and Cash Disbursements Processes)

Entities	Para	Activities	Process
Supplier	2	1. Log on to IPP.	
	2	2. Flip PO to invoice.	
IPP server	2	3. Post invoice to appreciating database.	
Enterprise adapter	2	5. Translate invoices into XML.	
BEPMIS	2	7. Post invoices to accounts payable database.	1.0 Record Invoices and invoice changes
	3	8. Perform three-way match of invoice, PO, receipt.	
	3	9. Extract and format invoice changes.	
Enterprise adapter	3	11. Convert changes from IDMS to XML.	
	3	12. Transmit invoice changes to IPP server.	
IPP Server	3	13. Post invoice changes to appreciating database.	
AP accountant	4	14. Trigger payment process.	
BEPMIS	4	15. Read and display invoices due for payment (assumed).	
AP accountant	4	16. Review invoices.	
	4	17. Select invoices for payment.	
BEPMIS	4	18. Extract and format payments.	
	4	19. Generate and digitally sign PIF file.	2.0 Select and approve payments
Enterprise adapter	4	23. Convert PIF from IDMS to XML.	
IPP Server	4	25. Post PIF to appreciating database.	
Contracting officer (CO)	4	26. Log on to IPP.	
	4	27. Approve PIF.	
Disbursing officer (DO)	4	28. Log on to IPP.	
	4	29. Approve PIF.	
IPP server	5	30. Generate ACH-formatted file from PIF.	
Boston Fed	5	34. Transfer ACH file to FedACH system.	
FedACH system	5	35. Settle payment (debit Treasury's account and credit supplier's bank's account).	3.0 Settle payments
Supplier's bank	5	38. Credit supplier's account.	

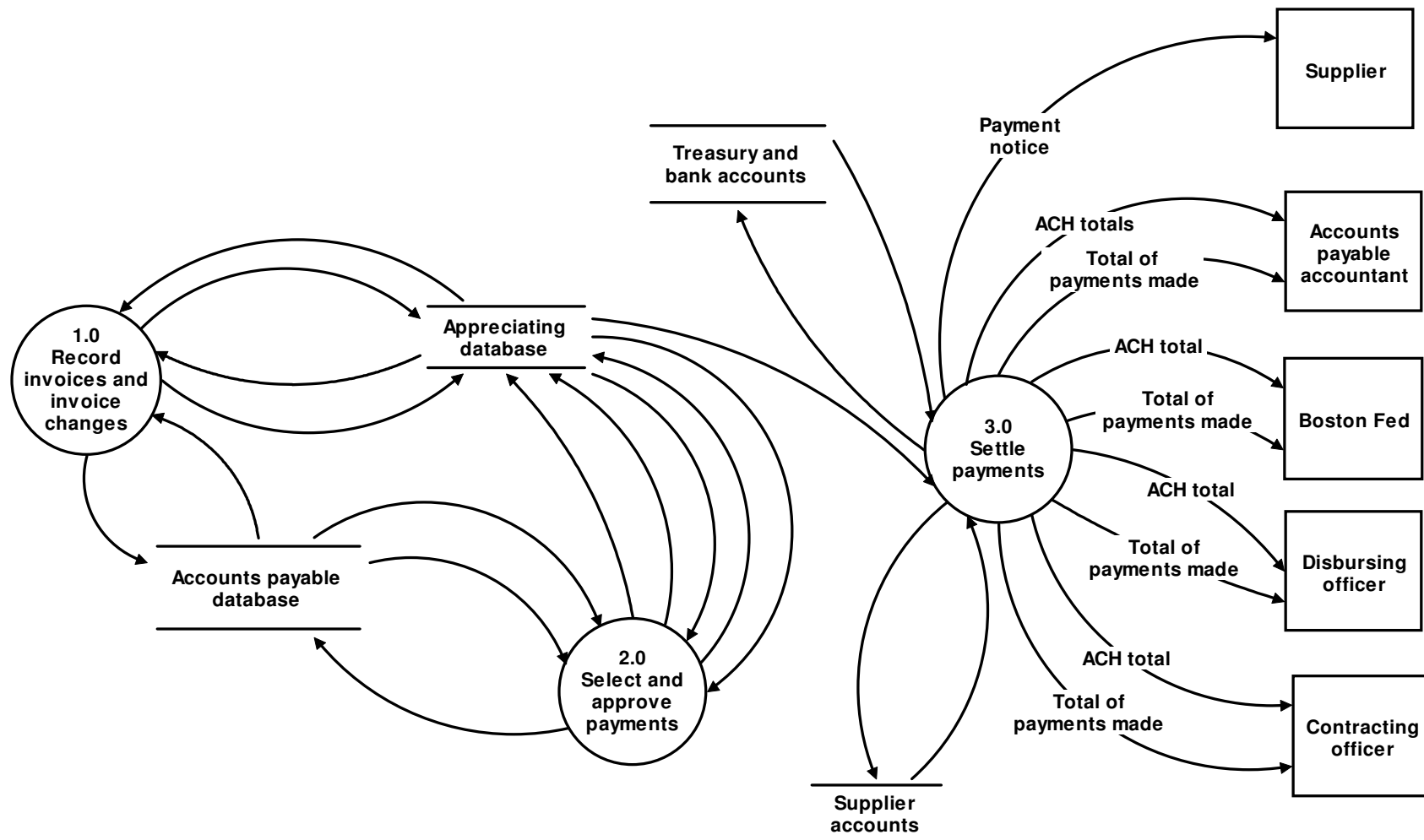


FIGURE SM-13.9 Problem 1, part e solution—logical DFD for Internet Payment Platform (Accounts Payable and Cash Disbursements Processes)

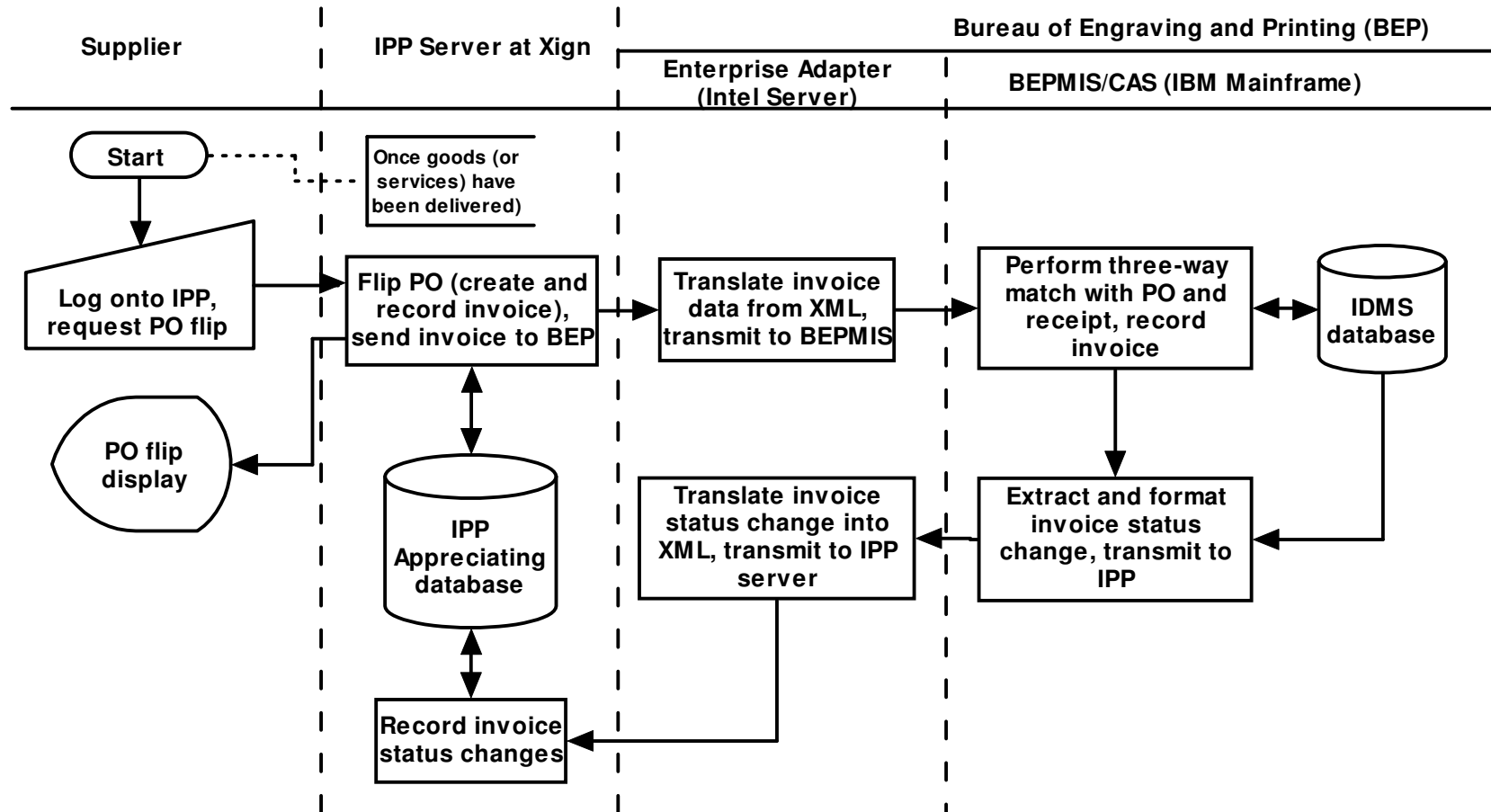


FIGURE SM-13.10 Problem 2, part a solution—systems flowchart for Internet Payment Platform (Accounts Payable and Cash Disbursements Processes)

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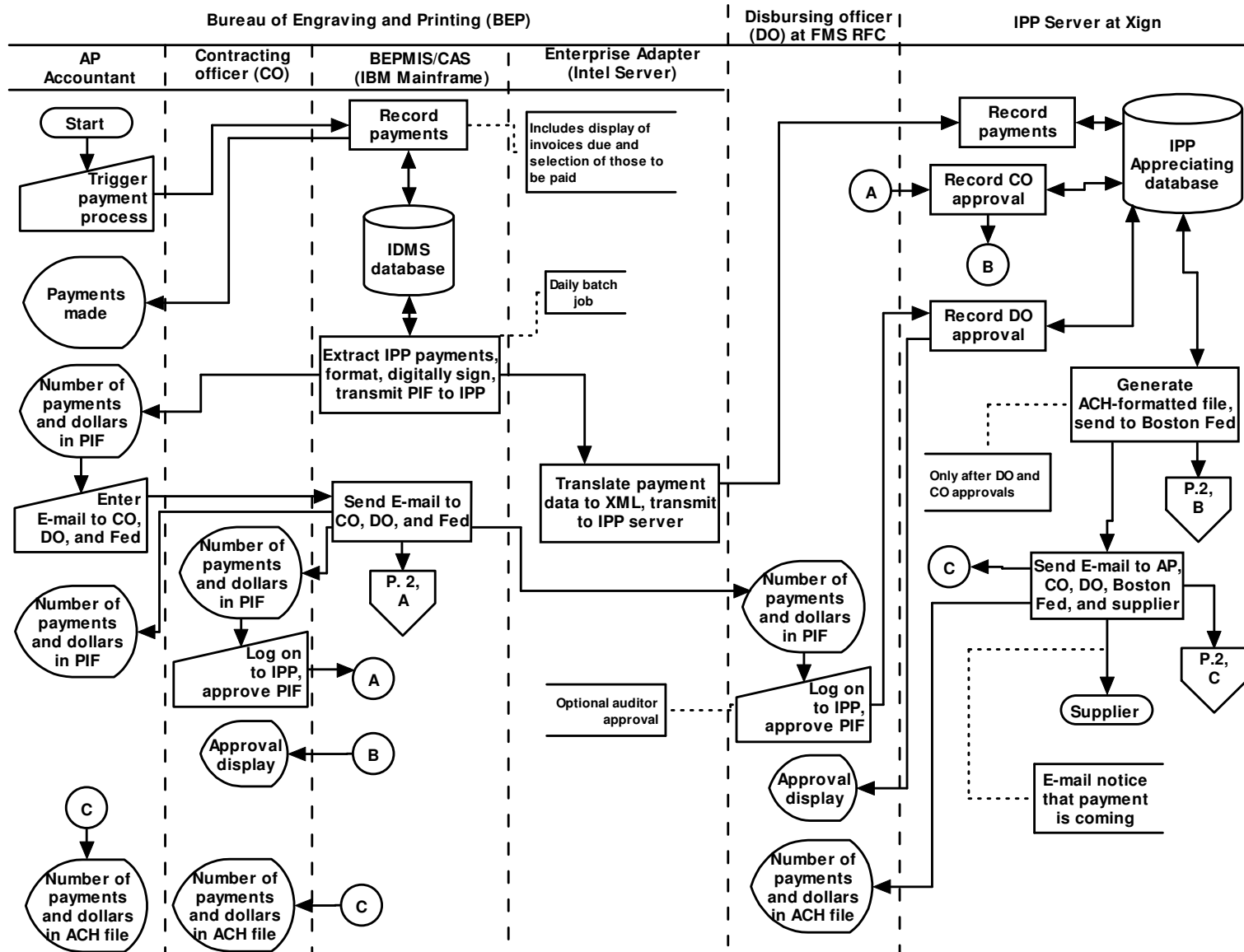


FIGURE SM-13.10 Problem 2, part a solution—systems flowchart (continued)

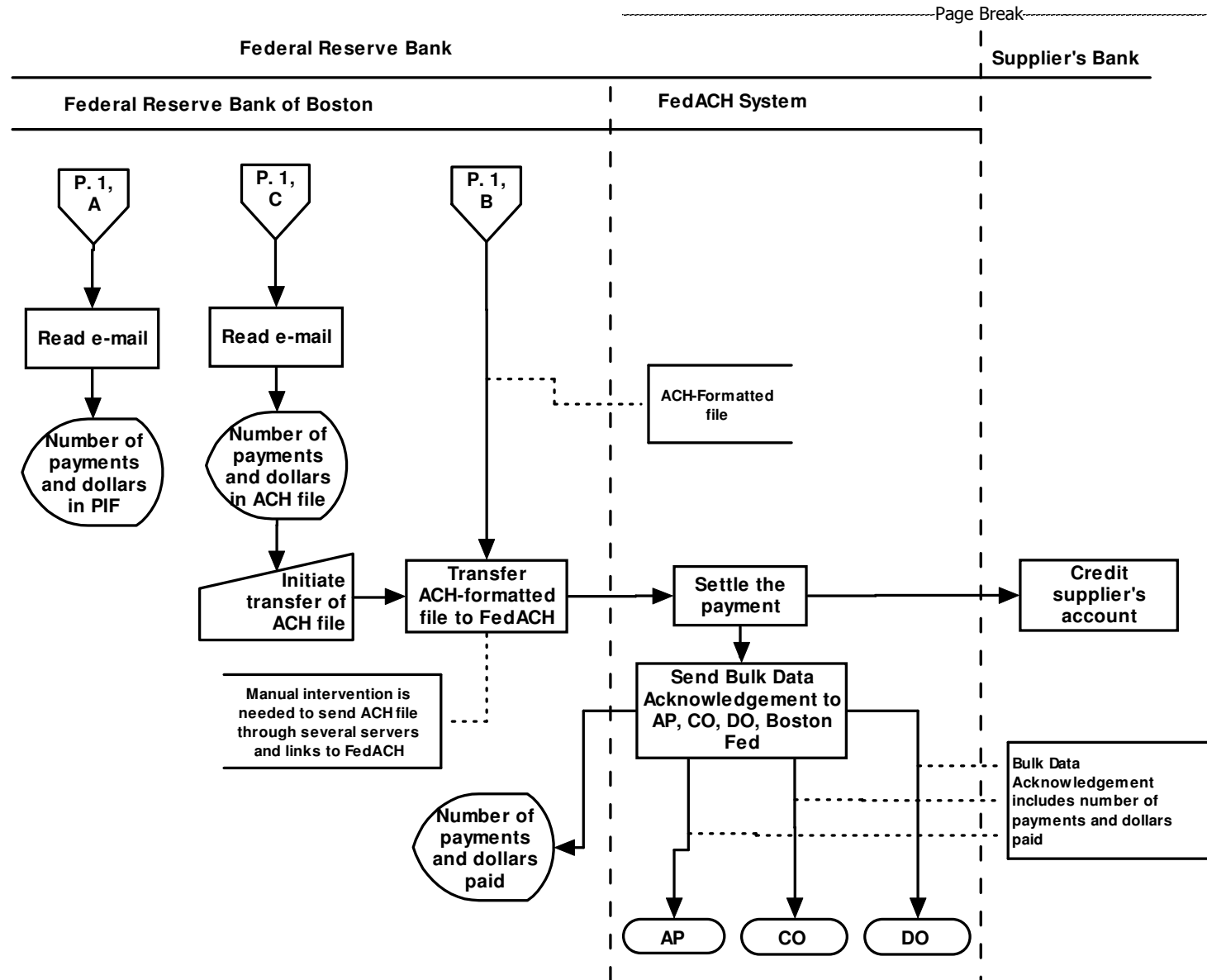


FIGURE SM-13.10 Problem 2, part a solution—systems flowchart (continued)

	Control Goals of the IPP Accounts Payable and Cash Disbursements Processes													
	Control Goals of the Operations Process				Control Goals of the Information Process									
	Ensure effectiveness of operations:		Ensure efficient employment of resources (people, computers)	Ensure security of resources (cash, AP master data)	For vendor invoice inputs, ensure:			For AP master data, ensure:		For payment inputs, ensure:			For AP master data, ensure:	
	A	B			IV	IC	IA	UC	UA	IV	IC	IA	UC	UA
Recommended control plans														
Present Controls														
P-1: Match PO and invoice (independent validation of vendor invoice) at IPP				P-1	P-1		P-1		P-1					
P-2: Cancel PO when invoice recorded at IPP				P-2	P-2									
P-3: Record invoice due dates and payment terms	P-3	P-3												
P-4: Match PO and receiving report to invoice (independent validation of vendor invoice) at BEPMIS				P-4	P-4		P-4		P-4					

Recommended control plans	Control Goals of the IPP Accounts Payable and Cash Disbursements Processes													
	Control Goals of the Operations Process				Control Goals of the Information Process									
	Ensure effectiveness of operations:		Ensure efficient employment of resources (people, computers)	Ensure security of resources (cash, AP master data)	For vendor invoice inputs, ensure:			For AP master data, ensure:		For payment inputs, ensure:			For AP master data, ensure:	
	A	B			IV	IC	IA	UC	UA	IV	IC	IA	UC	UA
P-5: Cancel PO and receiving report when invoice recorded at BEPMIS				P-5	P-5									
P-6: Follow-up on open POs at IPP	P-6					P-6		P-6						
P-7: Follow up on open POs and receiving reports at BEPMIS	P-7					P-7		P-7						
P-8: Select invoices for payment based on due dates	P-8													
P-9: Pay only open invoices and close invoices on payment (independent authorization to make payment) at BEPMIS				P-9						P-9				

	Control Goals of the IPP Accounts Payable and Cash Disbursements Processes													
	Control Goals of the Operations Process				Control Goals of the Information Process									
	Ensure effectiveness of operations:		Ensure efficient employment of resources (people, computers)	Ensure security of resources (cash, AP master data)	For vendor invoice inputs, ensure:			For AP master data, ensure:		For payment inputs, ensure:			For AP master data, ensure:	
	A	B			IV	IC	IA	UC	UA	IV	IC	IA	UC	UA
Recommended control plans														
P-10: Follow-up on open invoices at BEPMIS	P-10										P-10		P-10	
P-11: Digitally sign electronic payments				P-11						P-11	P-11	P-11	P-11	P-11
P-12: Follow-up on open invoices at IPP	P-12										P-12		P-12	
P-13: CO and DO approval required for payment				P-13						P-13		P-13		
Missing Controls														
M-1: Independent validation of vendor invoice at IPP does not include match to receiving report				M-1	M-1		M-1		M-1					

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Recommended control plans	Control Goals of the IPP Accounts Payable and Cash Disbursements Processes													
	Control Goals of the Operations Process				Control Goals of the Information Process									
	Ensure effectiveness of operations:		Ensure efficient employment of resources (people, computers)	Ensure security of resources (cash, AP master data)	For vendor invoice inputs, ensure:			For AP master data, ensure:		For payment inputs, ensure:			For AP master data, ensure:	
	A	B			IV	IC	IA	UC	UA	IV	IC	IA	UC	UA
M-2: Reconcile batch totals for invoices and changes			M-2	M-2	M-2	M-2	M-2	M-2	M-2					
M-3: Programmed edits for translated and formatted invoice (and invoice change) data							M-3		M-3					
M-4: Programmed edits for formatted and translated payment data												M-4		M-4
M-5: Reconcile payments made by BEPMIS to PIF totals			M-5	M-5						M-5	M-5	M-5	M-5	M-5
M-6: Reconcile approved payments to PIF totals			M-6	M-6						M-6	M-6	M-6	M-6	M-6

Recommended control plans	Control Goals of the IPP Accounts Payable and Cash Disbursements Processes													
	Control Goals of the Operations Process				Control Goals of the Information Process									
	Ensure effectiveness of operations:		Ensure efficient employment of resources (people, computers)	Ensure security of resources (cash, AP master data)	For vendor invoice inputs, ensure:			For AP master data, ensure:		For payment inputs, ensure:			For AP master data, ensure:	
	A	B			IV	IC	IA	UC	UA	IV	IC	IA	UC	UA
M-7: Reconcile ACH totals to PIF totals and approved PIF totals			M-7	M-7						M-7	M-7	M-7	M-7	M-7
M-8: Reconcile payments made by ACH to ACH file (and PIF totals and BEPMIS payment totals)			M-8	M-8						M-8	M-8	M-8	M-8	M-8

Possible effectiveness goals include the following:

A = Optimize cash discounts.

B = Ensure that the amount of cash maintained in demand deposit accounts is sufficient (but not excessive) to satisfy expected cash disbursements).

IV = input validity

IC = input completeness

IA = input accuracy

UC = update completeness

UA = update accuracy

See Exhibit SM 13.2 for a complete explanation of control plans and cell entries.

FIGURE SM-13.11 Problem 2, part b solution (partial)—control matrix for Internet Payment Platform (Accounts Payable and Cash Disbursements Processes)

Exhibit SM-13.2 Problem 2, part b solution (partial)—explanation of cell entries for control matrix in Figure SM-13.11

P-1: *Match PO and invoice (independent validation of vendor invoice) at IPP.*

Security of resources: Because cash cannot be expended in the absence of a validated vendor invoice, security over the cash asset is also enhanced.

Vendor invoice input validity, vendor invoice input accuracy, and vendor invoice update accuracy: By comparing the invoice to the PO, we ensure that the recorded invoice reflects goods actually ordered. We assume that the AP master data is updated simultaneously with the input of the invoice data.

P-2: *Cancel PO when invoice recorded at IPP.*

Security of resources and vendor invoice input validity: The PO flip feature prevents the matching of more than one invoice for each PO, thus ensuring that funds are not expended inappropriately (security of cash) and that invalid invoices are not recorded.

P-3: *Record invoice due dates and payment terms.*

Effectiveness goals A and B: Recording of terms and due dates allows cash discounts as appropriate (Goal A) and ensures that there is sufficient cash on hand to make those payments (Goal B).

P-4: *Match PO and receiving report to invoice (independent validation of vendor invoice) at BEPMIS.*

Security of resources: Because cash cannot be expended in the absence of a validated vendor invoice, security over the cash asset is also enhanced.

Vendor invoice input validity, vendor invoice input accuracy, and vendor invoice update accuracy: By comparing the invoice to the PO and receiving report, we ensure that the recorded invoice reflects goods actually ordered and received. We assume that the AP master data is updated simultaneously with the input of the invoice data.

P-5: *Cancel PO and receiving report when invoice is recorded at BEPMIS.*

Security of resources and vendor invoice input validity: The PO and receiving report are canceled upon performing the three-way match, thus preventing the matching of more than one invoice for each PO and receiving report. This ensures that funds are not expended inappropriately (security of cash) and that invalid invoices are not recorded.

P-6: *Follow up on open POs at IPP.*

Effectiveness goal A, vendor invoice input completeness, and vendor invoice update completeness: By following up on open POs (i.e., those with no matching

invoice), we can ensure that invoices are received in time to take advantage of discounts (Goal A) and are input in a timely manner (input completeness). We assume that the PO master data is updated simultaneously with the input of the receipt data.

P-7: *Follow up on open POs and receiving reports at BEPMIS.*

Effectiveness goal A, vendor invoice input completeness, and vendor invoice update completeness: By following up on open POs and receiving reports (i.e., those with no matching invoice), we can ensure that invoices are received in time to take advantage of discounts (Goal A) and are input in a timely manner (input completeness). We assume that the PO master data is updated simultaneously with the input of the receipt data.

P-8: *Select invoices for payment based on due dates.*

Effectiveness goal A: Ensures that payments are made in a timely manner, not too early and not too late (i.e., to optimize cash discounts).

P-9: *Pay only open invoices and close invoices upon payment (independent authorization to make payment) at BEPMIS.*

Security of resources: Because cash cannot be expended in the absence of a validated, open vendor invoice (and this invoice was recorded after matching it to the PO and receiving report), security over the cash asset is also enhanced.

Payment input validity: The accounts payable computer program approves vendor invoices for payment. Because the invoice was recorded after matching it to the PO and receiving report, the validity of the payment input is ensured.

P-10: *Follow up on open invoices at BEPMIS.*

Effectiveness goal A, payment input completeness, and payment update completeness: By following up on open invoices (i.e., those due for payment), we can ensure that payments are made in time to take advantage of discounts (Goal A) and are input in a timely manner (input completeness). We assume that the AP master data is updated simultaneously with the input of the payment data.

P-11: *Digitally sign electronic payments.*

Security of resources, payment input validity, payment input completeness, payment input accuracy, payment update completeness, and payment update accuracy: When the digital signatures are authenticated at IPP, they will know that the sender has the authority to send the PIF, which prevents the unauthorized diversion of resources (*security of resources*). This also determines that the PIF itself is genuine (*validity*), has not been altered in transit, and thus is complete and accurate. We assume that the AP master data is updated simultaneously with the input of the payment data.

P-12: *Follow up on open invoices (at IPP).*

Effectiveness goal A, payment input completeness, and payment update completeness: By following up on open invoices (i.e., those due for payment), we can ensure that payments are made in time to take advantage of discounts (Goal A) and are input in a timely manner (input completeness). We assume that the AP master data is updated simultaneously with the input of the payment data.

P-13: *CO and DO approval required for payment.*

Security of resources, payment input validity, and payment input accuracy: A contracting officer and a disbursing officer reviews each PIF to ensure that each payment is authorized (validity), accurate, and is not a misuse of resources.

M-1: *Independent validation of vendor invoices at IPP does not include a match to the receiving report.*

Security of resources: Because cash cannot be expended in the absence of a validated vendor invoice, security over the cash asset would be enhanced by matching the invoice to goods actually received.

Vendor invoice input validity, vendor invoice input accuracy, and vendor invoice update accuracy: By comparing the invoice to the receiving report (in addition to the PO), we could ensure that the recorded invoice reflects goods actually received (and ordered). We assume that the AP master data is updated simultaneously with the input of the invoice data.

M-2: *Reconcile batch totals for invoices and invoice changes.*

Efficient employment of resources: Using batch totals to reconcile the invoice data is more efficient than reviewing each invoice.

Security of resources and vendor invoice input validity: Determining that invoice inputs (and changes) reflect only those sent from IPP (or BEPMIS) ensures that cash will not subsequently be disbursed inappropriately (*security of resources*) and ensures the validity of the vendor invoice inputs (and changes).

Vendor invoice input completeness, vendor invoice input accuracy, vendor invoice update completeness, and vendor invoice update accuracy: By comparing totals received from IPP (or BEPMIS) to those produced after the update, we ensure that all vendor invoices (or changes) were input (*input completeness*) and that all vendor invoices (or changes) were input correctly (*input accuracy*). We assume that the AP master data is updated simultaneously with the input of the invoice data.

M-3: *Programmed edits for formatted and translated invoice data.*

Vendor invoice input accuracy and vendor invoice update accuracy: Edits at BEPMIS and the Enterprise Adapter would identify erroneous or suspect data and

reduce input errors at the IPP server. We assume that the AP master data is updated simultaneously with the input of the receipt data.

M-4: *Programmed edits for formatted and translated payment data.*

Payment input accuracy and payment update accuracy: Edits at BEPMIS and the Enterprise Adapter would identify erroneous or suspect data and reduce input errors at the IPP Server. We assume that the AP master data is updated simultaneously with the input of the payment data.

M-5: *Reconcile payments made by BEPMIS to PIF totals.*

Efficient employment of resources: Using batch totals to reconcile the payment data is more efficient than reviewing each payment.

Security of resources, payment input validity, payment input completeness, payment input accuracy, payment update completeness, and payment update accuracy: By reconciling batch totals, the AP accountant can ensure that payments sent to IPP reflect only those authorized, that cash is not disbursed inappropriately (*security of resources*), that only legitimate payments are sent to the IPP (*input validity*), that all data are sent (*input completeness*), and that all data are input accurately. We assume that the AP master data is updated simultaneously with the input of the payment data.

M-6: *Reconcile approved payments to PIF totals.*

Efficient employment of resources: Using batch totals to reconcile the payment data is more efficient than reviewing each payment.

Security of resources, payment input validity, payment input completeness, payment input accuracy, payment update completeness, and payment update accuracy: By reconciling batch totals, the CO and DO can ensure that payments approved at IPP reflect only those authorized, that cash is not disbursed inappropriately (*security of resources*), that only legitimate payments are approved at IPP (*input validity*), that all data are input (*input completeness*), and that all data are input accurately. We assume that the AP master data is updated simultaneously with the input of the payment data.

M-7: *Reconcile ACH totals to PIF totals.*

Efficient employment of resources: Using batch totals to reconcile the payment data is more efficient than reviewing each payment.

Security of resources, payment input validity, payment input completeness, payment input accuracy, payment update completeness, and payment update accuracy: By reconciling batch totals, the AP accountant, DO, CO, and Fed can ensure that payments sent to the Fed reflect only those authorized, that cash is not disbursed inappropriately (*security of resources*), that only legitimate payments are sent to the Fed (*input validity*), that all data are sent (*input completeness*), and

that all data are input accurately. We assume that the AP master data is updated simultaneously with the input of the payment data.

M-8: *Reconcile payments made by ACH to ACH file (and PIF totals and BEPMIS payments).*

Efficient employment of resources: Using batch totals to reconcile the payment data is more efficient than reviewing each payment.

Security of resources, payment input validity, payment input completeness, payment input accuracy, payment update completeness, and payment update accuracy: By reconciling batch totals, the AP accountant, DO, CO, and the Fed can ensure that settled payments reflect only those authorized, that cash is not disbursed inappropriately (*security of resources*), that only legitimate payments are made (*input validity*), that all payments are made (*input completeness*), and that all payments are made accurately. We assume that the AP master data is updated simultaneously with the input of the payment data.

Solution Note: Several controls not described in the previous list could be included in the solution to this problem, as present or missing, depending on assumptions made. For example:

- At each data entry location, we could include automated data entry, preformatted screens, online prompting, and confirm input acceptance.
- As data is entered into the system, we might find programmed edit checks, populate input screens with master data, and compare input data with master data.
- When there are programmed edit checks, manual comparisons, and reconciliation of batch totals, we might find procedures for rejected inputs.
- Where paper documents are employed, we might find document design, written approvals, and turnaround documents.